

What is claimed is:

1. An overlay mark having a mark pattern formed by engraving a groove or an indent in a prescribed position on a layer where a circuit pattern is formed, and a grooved pattern that surrounds said mark pattern so as to protect said mark pattern from being deformed by thermal expansion or contraction of said layer.

2. An overlay mark used for measuring the overlay accuracy in forming a second circuit pattern over a first circuit pattern; which has:

a first lower-layer pattern formed by engraving a groove or an indent in a prescribed position on a first layer where the first circuit pattern is formed, and an upper-layer pattern formed in a prescribed position on a second layer where the second circuit pattern is to be formed; and, in addition,

a second lower-layer pattern that is formed by engraving, on the first layer, a frame-shaped groove to surround the first lower-layer pattern, and is not used for measuring the overlay accuracy.

3. The overlay mark according to Claim 2, wherein the first lower-layer pattern is utilized as an alignment mark at the time of alignment to superimpose a mask onto a wafer in the step of exposure.

4. The overlay mark according to Claim 2;

wherein:

the first lower-layer pattern is either a
grooved pattern in the shape of a polygonal frame viewed
5 from the top or a polygonal depressed pattern; and

the second lower-layer pattern is a grooved
pattern in the shape of a polygonal frame viewed from the
top, being formed to surround the first lower-layer
pattern at a substantially equal interval.

5. The overlay mark according to Claim 2;

wherein:

the first lower-layer pattern is a grooved
pattern in which, viewed from the top, a pair of bar-
5 shaped patterns are arranged parallel, facing each other
with the upper-layer pattern between; and

the second lower-layer pattern is a grooved
pattern in the shape of a quadrangular frame viewed from
the top, and is formed to surround the whole of the first
10 lower-layer pattern, wherein sides of said frame-shaped
grooved pattern running parallel to respective bar-shaped
patterns in the first lower-layer pattern are disposed at
an equal interval to the corresponding opposite bar-
shaped pattern.

6. The overlay mark according to Claim 2;

wherein:

the first lower-layer pattern is a grooved pattern in which, viewed from the top, a pair of bar-shaped patterns are arranged parallel, facing each other with the upper-layer pattern between; and

the second lower-layer pattern is a grooved pattern comprising patterns, each in the shape of a quadrangular frame viewed from the top and formed to surround respective bar-shaped patterns of the first lower-layer pattern, wherein sides of said frame-shaped grooved pattern running parallel to respective bar-shaped patterns in the first lower-layer pattern are disposed at an equal interval to the corresponding opposite bar-shaped pattern.

7. The overlay mark according to Claim 5; which has a third lower-layer pattern, in a region surrounded by the second lower-layer pattern on the first layer, formed by engraving grooves to surround every bar-shaped pattern of the first lower-layer pattern separately, each in the shape of a frame; wherein:

sides of third lower-layer pattern running parallel to respective bar-shaped patterns in the first lower-layer pattern are disposed at an equal interval to the corresponding opposite bar-shaped pattern; while

the third lower-layer pattern is not used for measuring the overlay accuracy.

8. The overlay mark according to Claim 2, wherein said upper-layer pattern is formed from a resist layer laid over the second layer and comprises a pattern in the shape of a polygon, a frame or a bar viewed from the top.

9. An overlay mark used for making alignment to detect and decide an aligning position of a wafer and a mask, in the step of exposure during photolithography to form a second circuit pattern over a first circuit

5 pattern; which has:

a first pattern formed by engraving a groove or an indent in a prescribed position on a layer where the first circuit pattern is formed; and

10 a second pattern that is formed by engraving a frame-shaped groove to surround the first pattern, and is not used for making alignment.

10. The overlay mark according to Claim 9; wherein:

the first pattern is a grooved pattern in the shape of a polygonal frame viewed from the top; and

5 the second pattern is a grooved pattern in the shape of a polygonal frame viewed from the top, being formed to surround the first pattern at a substantially equal interval.

11. The overlay mark according to Claim 9;

wherein:

the first pattern is a grooved pattern in which, viewed from the top, bar-shaped patterns are
5 arranged parallel; and

the second pattern is a grooved pattern in the shape of a quadrangular frame viewed from the top, and is formed to surround the whole of the first pattern, wherein sides of said frame-shaped grooved pattern
10 running parallel to respective bar-shaped patterns in the first pattern are disposed at an equal interval to the corresponding opposite bar-shaped pattern.

12. The overlay mark according to Claim 9;

wherein:

the first pattern is a grooved pattern in which, viewed from the top, bar-shaped patterns are
5 arranged parallel; and

the second pattern is a grooved pattern comprising patterns, each in the shape of a quadrangular frame viewed from the top and formed to surround respective bar-shaped patterns of the first pattern,
10 wherein sides of said frame-shaped grooved pattern running parallel to respective bar-shaped patterns in the first pattern are disposed at an equal interval to the corresponding opposite bar-shaped pattern.

13. The overlay mark according to Claim 11; which

has a third pattern, in a region surrounded by the second pattern on the layer where the first circuit pattern is formed, formed by engraving grooves to surround every
5 bar-shaped pattern of the first pattern separately, each in the shape of a frame; wherein:

sides of third pattern running parallel to respective bar-shaped patterns in the first pattern are disposed at an equal interval to the corresponding
10 opposite bar-shaped pattern; while

the third pattern is not used for making alignment.

14. The overlay mark according to Claim 11, wherein, in place of said bar-shaped pattern, a pattern in which quadrangular indents are arranged in a line is formed.

15. The overlay mark according to Claim 12, wherein, in place of said bar-shaped pattern, a pattern in which quadrangular indents are arranged in a line is formed.

16. The overlay mark according to Claim 13, wherein, in place of said bar-shaped pattern, a pattern in which quadrangular indents are arranged in a line is formed.

17. A semiconductor device having a substrate on which the overlay mark according to Claim 1 is formed.

18. A semiconductor device having a substrate on which the overlay mark according to Claim 2 is formed.

19. A semiconductor device having a substrate on which the overlay mark according to Claim 9 is formed.

20. A method of measuring the overlay accuracy in forming a second circuit pattern over a first circuit pattern, wherein the overlay mark according to Claim 2 is used but, at least, the outermost lower-layer pattern is
5 not utilized to detect an overlay position.

21. A method of making alignment to detect and decide an aligning position of a wafer and a mask, in the step of exposure during photolithography to form a second circuit pattern over a first circuit pattern, wherein the
5 overlay mark according to Claim 9 is used but, at least, the outermost pattern is not utilized to detect an aligning position.